CLAIMS

1. (Original) A method of determining an acoustic velocity in a bone, comprising:

transmitting, from a location adjacent a first in-vivo bone, an acoustic wave having a wavelength about the same or smaller than a cross-section of the bone, which cross-section is perpendicular to a main travel direction of said acoustic wave in said bone;

receiving said acoustic wave at a location adjacent a second in-vivo bone; and

determining at least one acoustic characteristic of at least a portion of at least one of the first and second bones, from a travel time of said wave through said first and second bones and at least one joint between said bones,

wherein said acoustic characteristic comprises at least an acoustic velocity.

2. (Original) A method according to claim 1, wherein said locations have an unknown positional relationship.

3. (Original) A method according to claim 1, wherein said locations have a known positional relationship.

4. (Original) A method according to claim 1, wherein said receiving and said transmitting comprise receiving and transmitting using mechanically coupled acoustic elements.

5. (Original) A method according to claim 1, wherein said receiving and said transmitting comprise receiving and transmitting using mechanically uncoupled acoustic elements.

6. (Original) A method according to claim 1, wherein said acoustic wave has a frequency of at least 20kHz.

7. (Currently Amended) A method according to claim 1~~any of claims 1-6~~, wherein said acoustic characteristic comprises acoustic velocity.

8. (Currently Amended) A method according to claim 1any of claims 1-7, wherein said acoustic characteristic comprises acoustic attenuation.

9. (Currently Amended) A method according to claim 1~~any of claims 1-8~~, wherein said acoustic characteristic comprises polarization properties.

10. (Currently Amended) A method according to claim 1~~any of claims 1-6~~, wherein said at least one acoustic characteristic is determined for a plurality of wavelengths, to estimate a frequency dependent variation thereof.

11. (Currently Amended) A method according to claim 1~~any of claims 1-10~~, wherein the joint is articulated.

12. (Currently Amended) A method according to claim 1~~any of claims 1-10~~, wherein said first and second bones are interconnected by at least a third bone and wherein said at least one joint comprises at least one joint interconnecting said first bone and said at least third bone and at least a second joint interconnecting said at least third and said second bones.

13. (Original) A method according to claim 12, wherein said at least a third bone comprises at least two bones interconnected by a joint, through which the wave travels.

14. (Currently Amended) A method according to claim 1~~any of claims 1-13~~, wherein said wave travels between an elbow and a finger.

15. (Currently Amended) A method according to claim 1~~any of claims 1-13~~, wherein said wave travels between an elbow and a knuckle.

16. (Currently Amended) A method according to claim 1~~any of claims 1-13~~, wherein said wave travels between a knee and an ankle.

17. (Currently Amended) A method according to claim 1~~any of claims 1-13~~, wherein said wave travels between a trochanter and a pelvis.

18. (Currently Amended) A method according to claim 1~~any of claims 1-13~~, wherein said wave travels between two hips.

19. (Currently Amended) A method according to claim 1~~any of claims 1-13~~, wherein said wave travels along a rib.

20. (Currently Amended) A method according to claim 1~~any of claims 1-13~~, wherein said wave travels along a portion of a skull.

21. (Currently Amended) A method according to claim 1~~any of claims 1-13~~, wherein said bones comprise spinal vertebra.

22. (Currently Amended) A method according to claim 1~~any of claims 1-21~~, wherein receiving the acoustic wave comprises receiving at least a second acoustic wave, which second wave has a path including at least one shared path portion in bone with said first wave.

23. (Original) A method according to claim 22, wherein the two waves are received using a single receiver and are generated at two different locations.

24. (Original) A method according to claim 22, wherein the two waves are received using two receivers and are generated at a single location.

25. (Original) A method according to claim 24, wherein a line interconnecting said two receivers is not parallel to a surface of bone underlying the two receivers.

26. (Currently Amended) A method according to claim 22~~any of claims 22-25~~, wherein said travel time comprises a relative travel time of said two waves.

27. (Currently Amended) A method according to claim 22~~any of claims 22-26~~, wherein said two waves are generated simultaneously.

28. (Currently Amended) A method according to claim 22~~any of claims 22-26~~, wherein said two waves are generated as a single source wave.

29. (Currently Amended) A method according to claim 22~~any of claims 22-26~~, wherein said two waves are generated at a time delayed relative to each other.

30. (Currently Amended) A method according to claim 1~~any of claims 1-29~~, comprising repeating said transmitting and said receiving for at least a second acoustic wave, traveling in a direction opposite a traveling direction of said wave, to determine local acoustic bone

characteristics at an area which is traversed by both of said waves.

31. (New) A method of determining an acoustic bone characteristic, comprising:

transmitting an acoustic wave from a first location adjacent a first bone;

receiving said acoustic wave at least two locations adjacent a second bone, near each other, said locations being distanced from said first location an amount sufficient to cause said wave to travel along paths from said first location to a location near said two locations, which have at least one shared portion in bone; and

determining an acoustic characteristic of the bone adjacent said two locations from said received signals.

32. (New) A method according to claim 31, wherein said locations defining a line non-parallel to the bone surface.

33. (New) A method according to claim 32, wherein said first location is adjacent said bone.

34. (New) A method according to claim 32, wherein said first location is adjacent a different bone.

35. (New) A method according to claim 32, wherein said transmitting and said receiving utilize two mechanically uncoupled elements.

36. (New) A method according to claim 32, wherein said transmitting and said receiving utilize two mechanically coupled elements.

37. (New) A method according to claim 32, wherein said characteristic comprises a trabecular velocity of the bone.

38. (New) A method according to claim 32, wherein said characteristic comprises a cortical velocity of the bone.

39. (New) A method according to claim 32, comprising further receiving a second wave at or near said two locations from a second source at a second location, displaced from said two locations and using said received second wave in determining said characteristic.

40. (New) A method according to claim 39, wherein said second source is on an opposite side of said at least two locations, from said first location.

41. (New) A method according to claim 32, wherein all of said locations are not collinear.

42. (New) A method according to claim 32, wherein all of said locations are not coplanar.

43. (New) A method of determining a property of a bone, comprising:

transmitting an acoustic wave having a frequency of above 20 kHz along an axis of said bone, through at least a core thereof;

receiving said wave after said travel; and

analyzing said received wave to determine at least one acoustic characteristic of said bone.

44. (New) A method according to claim 43, wherein said acoustic characteristic comprises an acoustic velocity.

45. (New) A method of bone velocity measurement, comprising:

transmitting at least one acoustic wave into a bone at a first location;

receiving said wave at at least two locations outside said bone, after is passes through said bone, wherein said first location and said at least two locations are not collinear; and

determining a trabecular velocity of said bone from said received wave.

46. (New) A method according to claim 45, wherein said bone comprises an ankle bone.

47. (New) A method of determining an acoustic velocity in a bone, comprising:

transmitting an acoustic wave from a first location adjacent an in-vivo bone;

receiving said acoustic wave at a second location adjacent the bone, which second location has an unknown positional relationship relative to said first location; and

determining an acoustic velocity of at least a portion of said bone, from a travel time of said wave between said first and said second locations.

48. (New) A method according to claim 47, wherein receiving comprises receiving using two

receivers.

49. (New) A method according to claim 48 and including a difference in time of receipt of the wave by said two receivers, wherein determining comprises determining from said time difference.

50. (New) Apparatus for determining an acoustic velocity in at least a portion of an in-vivo bone, comprising:

a transmitter for generating acoustic signals;

at least one receiver, mechanically uncoupled from said transmitter during said determining, for receiving said generated acoustic signals after they travel through a bone; and

circuitry for determining an acoustic velocity in said bone responsive to said received wave.

51. (New) Apparatus according to claim 50, wherein said circuitry determines said velocity responsive to a relative arrival time of said wave.

52. (New) Apparatus according to claim 50, wherein said at least one receiver comprises at least two receivers.

53. (New) Apparatus according to claim 52 and wherein there is a difference in time of receipt of the wave by said two receivers, wherein said circuitry determines said acoustic velocity from said time difference.

54. (New) A method of determining a characteristic of a bone, comprising:

transmitting, from a location adjacent a first in-vivo bone, an acoustic wave having a frequency of at least 20kHz;

receiving said acoustic wave at a location adjacent a second in-vivo bone; and

determining at least one acoustic characteristic of at least a portion of at least one of the first and second bones, from a travel time of said wave through said first and second bones and at least one joint between said bones.

55. (New) A method according to claim 54, wherein said acoustic characteristic comprises acoustic velocity.

56. (New) A method according to claim 54, wherein said acoustic characteristic comprises acoustic attenuation.

57. (New) A method according to claim 54, wherein said acoustic characteristic comprises polarization properties.

58. (New) A method according to claim 54, wherein said acoustic characteristics are determined for a plurality